

STUDIES ON AUSTRALIAN MARINE ALGAE. I.

THE CORRECTED NAME FOR *PTEROCLADIA PECTINATA* (A. & E. S. GEPP) LUCAS.

By VALERIE MAY, M.Sc. (C.S.I.R., Marine Biological Laboratory, Cronulla, N.S.W.).

(Six Text-figures.)

[Read 29th November, 1944.]

GELIDIUM LUCASII, new name.

Syn.: *Pterocladia lucida* f. *pectinata* A. & E. S. Gepp, *J. Bot.*, xliv, 1906. *Pterocladia pectinata* (A. & E. S. Gepp) Lucas, *Proc. Linn. Soc. N.S.W.*, lvi, 1931. Not *Gelidium pectinatum* Montagne, *Hist. Nat. des Iles Canaries*, iii (2), 1840.

In Maroubra Bay, near Sydney, New South Wales, in July, 1901, A. H. S. Lucas collected an alga (No. 9) of which he sent part to A. & E. S. Gepp; part is also retained at the National Herbarium, Sydney. In 1906, A. & E. S. Gepp described this alga as *Pterocladia lucida* f. *pectinata*, but did not refer to any of the reproductive structures. The specimen labelled No. 9 at the National Herbarium, which is doubtless part of the type collection, shows the presence of tetraspores; other specimens collected at the same time are freely tetrasporic.

In the same locality in 1910, Mr. Lucas found cystocarpic material of this plant, and in 1931, he published a description in which he raised the plant to specific rank. No further publication on this species has appeared.

Due to recent collections by the writer, samples of this species are available now in quantity sufficient to enable a more adequate examination of it to be made. From this examination, and a re-examination of all Lucas' material (National Herbarium, Sydney, and Lucas Collection, Council for Scientific and Industrial Research, Canberra), it now seems that *Pterocladia pectinata* (A. & E. S. Gepp) Lucas should be referred to the genus *Gelidium*, and as the name *Gelidium pectinatum* is already in use, I now propose for it the name *Gelidium Lucasii*, in honour of Mr. A. H. S. Lucas, who was for many years Australia's foremost worker on algae, and who first collected the plant under discussion.

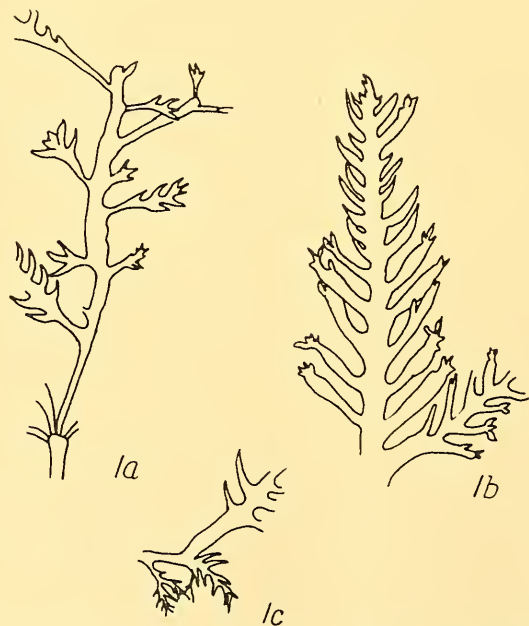


Fig. 1.—*Gelidium Lucasii*, new name. Habit. [See also photograph in Lucas (1931).] 1a, near base, $\times \frac{5}{12}$; 1b, at apex, and bearing cystocarps, $\times \frac{4}{5}$; 1c, attachment region, $\times \frac{5}{12}$. (All magnifications are approximate only; sizes vary greatly in any individual plant.)

The distinction between the genus *Pterocladia* and the genus *Gelidium* is that the cystocarp is unilocular in the former and bilocular in the latter. In all the cystocarpic material of the plant under discussion examined, the cystocarps are bilocular (Fig. 5).

Though it has generally been considered in the past that the cystocarpic distinction is the only one between these allied genera, Okamura (1934) in Japan has tried to link the anatomical to the cystocarpic characters, and says that in cross-sections of the thallus, filaments are more evident towards the centre in *Pterocladia*, and toward the periphery in *Gelidium*. However, in making this rule, he admits there are many exceptions. The present species is such an exception, in that there are filaments present in the central tissue. Okamura (loc. cit.) further claims that in *Gelidium* the tetrasporic sorus is strictly limited with a sharply defined boundary, while in *Pterocladia* the sorus is less clearly defined. The sorus of *G. Lucasii* (Fig. 6b) is of the form described for *Gelidium*. Thus the cystocarp determines that the plant is, in fact, a *Gelidium*, and this is in accordance with the structure of the tetrasporic sorus.

From a study of the literature it would appear that *G. Lucasii* is near *G. subcostatum* Okamura (figured in Okamura, 1907). Both have the frond compressed, two-edged

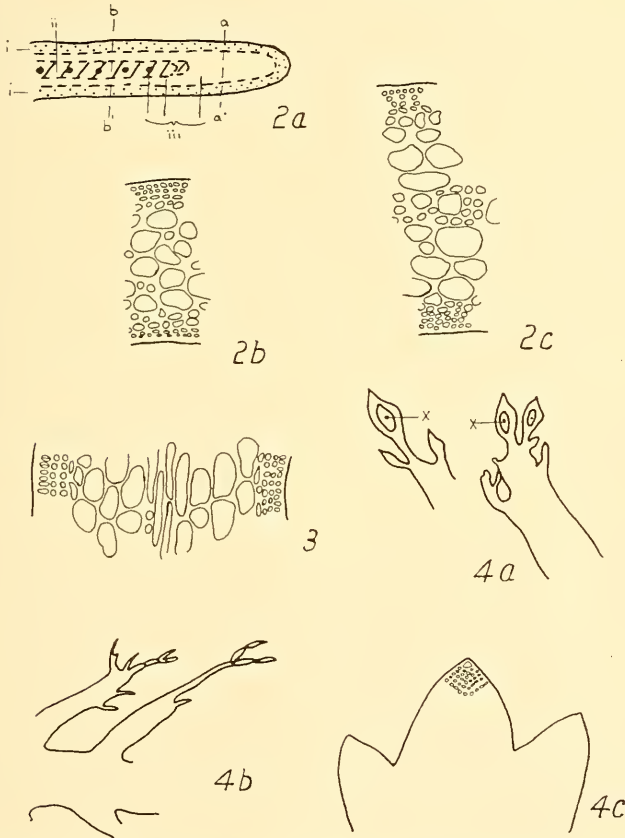


Fig. 2.—*Gelidium Lucasii*, new name. Transverse sections of thallus. Periphery (i) is of small coloured cells, while other cells have thick, mucilaginous walls. Filaments (ii) have granular contents; larger cells (iii) are relatively clear. 2a, diagrammatic representation of transverse section of thallus; 2b, transverse section of thallus along line b-b¹, $\times 225$; 2c, transverse section of thallus along line a-a¹, $\times 225$.

Fig. 3.—*Gelidium Lucasii*, new name. Longitudinal section of thallus in region b-b¹ of Fig. 2a. $\times 225$.

Fig. 4.—*Gelidium Lucasii*, new name. Cystocarpic branches. 4a, apices of branches (cystosporangia) which bear cystocarps, $\times 5$; x = ostiole. 4b, apices of old branches which have produced cystocarps, $\times 5$. 4c, apex of young cystosporangium showing apical cell. This apical cell is soon lost from vegetative apices, but is obvious in both cystosporangium and tetrasporangium, $\times 150$. (All magnifications are approximate only.)

distichously pinnate and of similar structure, but the Australian plant may be distinguished easily from the Japanese plant, for the latter develops a distinct midrib and the pinnae are very much shorter in comparison with branch width, than is the case in *G. Lucasii*.

The distribution of *G. Lucasii* appears very limited. We have records of it from:

Maroubra, near Sydney, N.S.W.	..	July, 1901	A. H. S. Lucas	Tetrasporic
" " " "		July, 1910	A. H. S. Lucas	Cystocarpic
Bondi, near Sydney, N.S.W.	—	S. E. Napier	Sterile only
East Cape, N.Z.	—	—	Cystocarpic
Collaroy Beach, near Sydney, N.S.W.		April, 1944	Valerie May	Few cystocarpic; many tetrasporic
" " " " "		May, 1944	Valerie May	Cystocarpic and tetrasporic
" " " " "		July, 1944	Valerie May	Cystocarpic and tetrasporic

There is also (National Herbarium, Sydney) a plant, "Loc. and coll. unknown", bearing cystocarps.

All records appear to be of plants washed ashore after heavy storms—all those collected at Collaroy were so—and the 1901 Maroubra material is reported as having been washed ashore after a southerly gale. Thus the species is evidently confined to deep water.

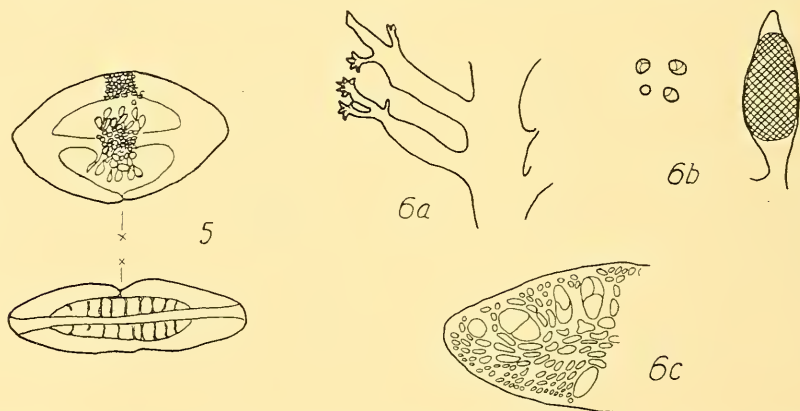


Fig. 5.—*Gelidium Lucasii*, new name. Transverse section of cystocarps showing bilocular structure and variation in shape; x = ostiole.

Fig. 6.—*Gelidium Lucasii*, new name. Tetrasporic material. 6a, branches (tetrasporangia) bearing tetraspores, $\times 5$; 6b, a tetrasporangium, showing region which bears tetraspores arranged in irregularly decussate manner, $\times 25$, also surface section of tetraspores separated from parent plant, $\times 125$; 6c, transverse section of tetrasporangium showing tetraspores in varying stages of development, i.e., of mixed ages, $\times 225$. (All magnifications are approximate only.)

It seems that the Sydney district and one locality in New Zealand are the only habitats recorded for this species. Since our knowledge of Australasian algae is only meagre, we should not, of course, be surprised if the range should prove to be much greater than is known at present.

Because of the present economic stimulus to investigations of the Gelidiales, it is hoped that we may learn more about their distribution.

Bibliography.

- GEPP, A. and E. S., 1906.—Some Marine Algae from New South Wales. *J. Bot.*, 44: 254.
 LUCAS, A. H. S., 1931.—Notes on Australian Marine Algae. vi. *PROC. LINN. SOC. N.S.W.*, 56: 408. Pl. xxiii, fig. 2.
 MONTAGNE, C., 1840.—Flora d'Algérie. In Barker-Webb, P., and Berthelot, Sabin. *Histoire Naturelle des Iles Canaries*, 3 (2). *Phytographia Canariensis sectio ultima. Plantae cellulaires*. Paris. p. 108. Pl. x, fig. 1.
 OKAMURA, K., 1907.—Icones Japan. Alg., 1. p. 233. Pl. xlv.
 ———, 1934.—On *Gelidium* and *Pterocladia* of Japan. *J. Imp. Fish. Inst. Tokyo*. 29: 45-67.